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Problem coping skills, psychosocial adversities and mental health problems in children and adolescents as predictors of criminal outcomes in young adulthood

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Abstract

Objective: To test child and adolescent psychosocial and psychopathological risk factors as predictors of adult criminal outcomes in a Swiss community sample. In particular, the role of active and avoidant problem coping in youths was analysed. **Methods:** Prevalence rates of young adult crime convictions based on register data were calculated. Univariate and multivariate logistic regressions were used to analyse the prediction of adult criminal convictions fifteen years after assessment in a large Swiss community sample of children and adolescents (N = 1,086). Risk factors assessed in childhood and adolescence included socio-economic status (SES), migration background, perceived parental behaviour, familial and other social stressors, coping styles, externalizing and internalizing problems and drug abuse including problematic alcohol consumption. **Results:** The rate of any young adult conviction was 10.1%. Besides externalizing problems and problematic alcohol consumption, the presence of any criminal conviction in young adulthood was predicted by low SES and avoidant coping even after controlling for the effects of externalizing problems and problematic alcohol use. The other predictors were significant only when externalizing behaviours and problematic alcohol use were not controlled. **Conclusions:** In addition to child and adolescent externalizing behaviour problems and substance use, low SES and inadequate problem-solving skills, in terms of avoidant coping, are major risk factors of young adult criminal outcomes and need to be considered in forensic research and criminal prevention programs.

Keywords: adolescence, adult crime, alcohol use, coping, externalizing behaviour problems

Introduction

Very often, the roots of adult criminal behaviour lie in childhood and adolescence and therefore, it is an important challenge for child and adolescent psychiatry to serve in a preventive manner. In order to best fulfil this task, a comprehensive understanding of developmental processes of criminal behaviour is warranted. Different trajectories of aggressive and delinquent behaviours in childhood and adolescence have been identified in longitudinal studies based on community samples and birth cohorts [32, 35, 36]. Most notably, a child-onset, life-course-persistent type and an adolescent-limited type have been suggested [31] and confirmed as a valid taxonomy of antisocial behaviour in youth [32, 36]. Whereas in the child-onset, life-course-persistent type, criminal behaviour is associated with psychosocial adversities, neurocognitive deficits, psychopathology and difficult temperament, the adolescent-limited type is conceived as a kind of temporary maladjustment.

Even though these typologies assume cumulative risks, it is also important to focus on the impact of distinct risk factors for adult crime in order to plan preventive strategies. Throughout various countries and cultures, one of the strongest risk factors for criminal behaviour is a preceding psychopathology. Irrespective of differences in design and methodology, several population-based studies were able to consistently link child and adolescent conduct problems to later criminal outcomes in adulthood [4, 8, 10, 15, 16, 22, 29, 36, 39, 44, 51]. Another risk factor was substance abuse, with community-based studies reporting that early drug use, including alcohol use, were related to later criminal outcomes [5, 10, 21, 51]. Additionally, the consumption of so-called *hard* drugs predicted persistent criminal offending behaviours even when controlling for other forms of conduct problems [10, 51]. In contrast, the adolescent internalizing disorders do not seem to play an equally important role in the prediction of adult crime. Only one study found anxiety and depression, when comorbid with substance abuse, to be associated with adult crime [10]. However, other studies failed to find a relationship between adolescent internalizing disorders and adult crime when controlling for externalizing disorders [44].

Besides psychopathology, concepts of adult criminal behaviour also emphasize the exposure to childhood psychosocial adversities such as low socio-economic status (SES), criminal neighbourhood, parental criminality, negative bonding to parents, harsh discipline and a lack of parental supervision [14, 17, 19]. Further risk factors include the exposure to extrafamilial stressors like school failure,

bullying, rejection by peers or the experiencing of violence [7, 14]. A European study has also shown that migration was associated with criminal behaviours in youths as well as in adults [24]. However, impacts of psychosocial factors are controversial since externalizing psychopathology remained the strongest predictor overruling psychosocial risk factors [15, 16] and psychosocial risk factors and their developmental impact vary substantially in different cultures and countries.

Only a minor part of youth growing up with psychosocial factors will develop criminal behaviours in adulthood. Hence, the question of vulnerability for delinquent behaviour and crime in terms of personality features of youth has to be raised. Among the various features, the ability of young people to cope with external stressors may be a relevant factor in the development of criminal and aggressive outcomes. Coping refers to all strategies an individual uses to manage stress and coping skills encompass active problem-solving strategies as well as emotional and behavioural strategies to tolerate stress [26].

Whereas the role of coping skills has been extensively studied with regard to emotional disorders and school performance [9], relatively few studies have addressed the role of coping in relation to externalizing problems and criminal behaviours. Sociological theories have conceptualized crime as a response to problems involving frustration and adverse social environments [2]. Individuals who are able to cope with socio-emotional problems by seeking help, talking to others and actively looking for solutions will be more successful at school, at work and with social relationships. This, in turn, will lead to fewer experiences of being emotionally frustrated. Consequently, individuals with adequate coping skills will be less prone to develop aggression and criminal behaviours. In contrast, individuals with an avoidant coping style may be inclined to distract themselves from actual problems with criminal behaviours and/or substance abuse.

Several studies suggest that inadequate coping is related to delinquent behaviours in youths [12, 20, 42]. For instance, in a controlled study from Russia [42], juvenile detainees more frequently reported avoidant coping (e.g., distraction, emotional desistance) when compared with non-delinquent controls. Further studies found that avoidant coping was associated with drug abuse and dependency in incarcerated youths [12] and with delinquency in a school-based sample of youths in Australia [20]. The latter study suggested that coping skills training could be an effective intervention against

delinquent behaviour. Indeed, problem-solving skills have been included in forensic treatment programs for youth and adult offenders [e.g. 30, 41].

Criminality is a challenging phenomenon to study because it evades scrutiny [44]. Self reports of offending, victim reports and official police or court statistics are the most common methods of collecting data on criminal behaviours. However, none of these methods will provide a complete picture of crime. In previous studies, self-reported delinquency questionnaires [8, 14, 16, 29, 36, 39, 51], police reports [22, 44], official charges [10] or convictions [14, 22, 36] were used to measure criminal outcomes in adulthood. Few studies have reported both self-reported and official information on criminal behaviours [14, 36]. Victim reports have been used only in one previous study to measure partnership violence in adulthood [36]. Self reports probably provide the most detailed information on criminal behaviours but are limited to offenders who are willing to report their crimes. In contrast, official data are limited to offenses that have been reported to the police and/or by offenders who were found guilty by a court. Even in crime conviction records, certain crimes like serious driving offenses may be represented more frequently than in other sources of information.

The present study was based on data from the Zurich Adolescent Psychological and Psychopathological Study (ZAPPS) that addressed several risk and vulnerability factors impacting mental health problems [46]. Findings based on the ZAPPS provided evidence that within the underlying multivariate model of mental health problems, coping deficits play a significant role [46]. The present contribution expands the scope of the ZAPPS from adolescent mental health problems to criminal outcomes in adulthood with several aims.

First, with the attempt to replicate previous international studies, the impact of psychosocial and psychopathological risk factors on adult criminal outcomes was analyzed in a Swiss community sample. Due to socioeconomic and cultural differences, psychosocial risk factors including SES, migration background, familial and other social stressors and child rearing styles may have a different impact in various countries. Given the findings of previous international studies, it was hypothesized that problematic alcohol use, drug abuse and externalizing mental health problems constitute universal risk factors for later criminal behaviour [4, 8, 10, 15, 16, 22, 29, 36, 39, 44, 51]. We also analysed the interaction between sex of the proband and other predictors and then tested an abbreviated

externalizing problem scale without the items indicating a specific relationship to criminal behaviours. Second, within this multivariate model of the origins of adult crime, the role of active and avoidant coping as an additional predictor for adult criminal outcomes was of particular interest. Because males and females have similar risk factors for later criminal outcomes [4], data from both sexes were included in the analyses. Official reports of criminal convictions were used as an objective, but rather conservative measure, of criminal behaviour that may underreport the true number of crimes.

Materials and methods

Sample and study design

The study design and basic demographic features of the ZAPPS have been described in detail in a previous publication [50]. Subjects were studied longitudinally at four times between 1994 and 2006. For the present study, data was based on 1,086 students who took part in the first wave of the ZAPPS. The original sample consisted of 1,964 pupils between 6 and 17 years of age who attended the first to the ninth grade in various types of schools in 1994. The sample was representative of the residents in the Canton Zurich in terms of gender, the twelve regional counties and the proportion of child and adolescents living in rural versus urban areas. Out of this sample, a total of 1,239 children and adolescents from the fifth to the ninth grade responded to various self-report instruments (see below) whereas children from the first to the fourth grade were considered too young for responding to self reports. Among the 1,239 youths, 153 (12.3%) did not respond to the questionnaires or had more than 10% missing items in one or more of the instruments so that they were excluded from the present study. Thus, the final sample consisted of 1,086 students aged between 10.7 and 17.9 years.

The mean age of the final sample at the first assessment was 13.85 (SD = 1.52) years and the sample consisted of 553 (50.9%) males and 533 (49.1%) females. A total of 146 (13.4%) of the children and adolescents were of foreign nationality. At the time of the follow-up assessments the mean age was 29.6 (SD = 1.62, range = 26.4–33.7) years.

Instruments

Demographic measures: In agreement with the Swiss Health Survey [53], the socio-economic status (SES) was based on education (untrained, some vocational training, completed vocational training,

completed upper secondary education, completed university education with a master degree) and professional occupation (unemployed, simple employee with no managing responsibility, employed with at least some managerial responsibility, self-employed or a manager with extended responsibility) of the parents and was assigned to five ordinal levels (low, lower medium, medium, upper medium, and high). Because SES was not assessed in the 1994 study, data were obtained three years later from the second wave of the study in which 780 adolescents from the original sample were included (36 low SES, 94 lower medium SES, 443 medium SES, 136 upper medium SES and 71 high SES). For the 306 non-participants of the second wave, the median of the sample (medium SES) was entered. Foreign nationality was coded from self-reports. The general neighbourhood crime rate was taken from official police records in 1994 [56] and was coded as the average rate for 1,000 citizens separate for the 12 regions of the Canton of Zurich and the 12 urban districts of Zurich city. Neighbourhood crime rates varied between 36 and 117 crimes per 1,000 residents in the Canton Zurich (mean = 77.5, SD = 24.0) and between 93 and 3,121 crimes per 1,000 residents of Zurich city (Mean = 465.3, SD = 863.0).

Objective and subjective stressors: The Zurich Life Event Scale (ZLES) consists of 36 items covering the most relevant domains in the lives of youths (life events in the family, life events at school, life events in friendships, illnesses and accidents) that have an impact on the adaptation of adolescents [48]. The time frame is defined as 12 months prior to filling out the questionnaire. The instrument assesses both objective (number of stressors) and subjective stress (perceived impact of stressors). The items used as objective stressors had a dichotomous response scale (yes/no). Additionally, positive responses had to be rated on a five-point Likert scale (very unpleasant, unpleasant, neutral, pleasant, very pleasant). Internal consistency coefficients for the subjective stress impact score were 0.74 for boys and 0.77 for girls [48]. For the present study, only those 30 items that previously showed a negative impact were considered [48]. Girls, compared to boys, were found to report more stressful life events. For both genders the number of life events, as well as the subjective stress, was related to mental health problems [48]. Considering familial influences on criminal behaviours [14], in the present study the items of the scale were assigned to two new scales named *familial stressors* consisting of 12 items (e.g., alcohol abuse by a family member, familial communication problems, familial health problems, imprisonment of a family member) and external stressors consisting of 18 items (e.g., partnership problems, occurrence of natural disasters, financial problems, school failure).

Perceived parental behaviours: The Perceived Parental Behaviour (PPB) questionnaire measures parental behaviour from the adolescents point of view [40]. The instrument includes 32 items that have to be answered separately for mothers and fathers on a four-point Likert scale (not true, less true, somewhat true, very true). Exploratory factor analyses were performed separately for mothers and fathers and revealed three scales labelled *acceptance* (e.g., "my mother/father praises me when I do something good"), *rejection* (e.g., "my mother/father easily becomes upset if I don't do what she/he says") and *control* (e.g., "my mother/father has clear rules for my behaviour"). Because the scales were identical for both maternal and paternal behaviour and correlated highly ($r = 0.71–0.79$), the scores for the two parents were combined. Internal consistencies of the scales were acceptable for the present study ($\alpha = 0.68–0.89$). Concurrent validity of the scales was also confirmed by showing differential associations with self-esteem and mental health problems that were in agreement with the literature [40].

Coping style: The Coping Across Situations Questionnaire (CASQ) is a self-report style instrument for youths to assess various strategies of problem-solving behaviour [43]. A shortened version of the CASQ was used in the ZAPPS and was based on 80 dichotomous items. *Proactive coping* (e.g., "I discuss the problem with my parents") and *avoidant coping* (e.g., "I try not to think about the problem") was measured across four age-specific problem areas in adolescence (school, parents, peers, and the opposite gender). Reliability and external validity of the instrument was assessed in a previous study and were found sufficient [55].

Alcohol and other drug use: The Substance Use Questionnaire (SUQ) was designed by Müller and Abbet [33] in collaboration with the World Health Organization for a nationwide Swiss survey. It covers 22 items that deal with the consumption of both legal and illegal drugs. A previous study based on the longitudinal data of the ZAPPS confirmed the discriminant validity of four types of adolescent drinkers, namely, abstainers, social drinkers, heavy drinkers and problem drinkers [47]. Problem drinkers were found to differ from other types of adolescent drinkers and showed the highest level of mental health problems and the most negative psychosocial outcomes. Based on the findings of a former study [47], we decided to use the criterion of a problem drinker as a predictor for adult criminal outcomes. Accordingly, problematic alcohol use was defined as consumption of alcohol in the last month when

feeling bad because of problems or when feeling lonely. This definition includes younger adolescents at risk for later alcohol abuse and dependency but who have not yet started using alcohol regularly. Other drug abuse was coded as present when the subject used any kind of illegal drugs in the last three months.

Internalizing and externalizing mental health problems: The Youth Self Report (YSR) [1] is a common measure of assessing self-reported behavioural and emotional problems in children and adolescents during the past six months. This instrument consists of 118 items that can be scored on a three-point rating scale (0 = not true, 1 = somewhat true and 2 = very true) and were leading to a total problem scale, two second order scales (internalizing and externalizing) and eight empirically derived first order syndrome scales (withdrawn, anxious/depressed, somatic problems, social problems, thought problems, attention problems, aggression, and delinquent behaviours scales). Reliability and validity have been shown to be good for the original YSR versions in the US [1] as well as for the corresponding Swiss YSR version [49]. In the present study, the internalizing and externalizing problem scales of the YSR were used. Additionally, an abbreviated YSR externalizing problem scale excluding items 72 (firesetting), 81 (steals at home) and 82 (steals outside home) was tested. Internal consistency coefficients for the YSR internalizing problem scale, for the YSR externalizing problem scale and for the abbreviated YSR externalizing problem scale were 0.86, 0.84 and 0.83, respectively.

Attrition analyses showed that the 153 drop-outs in comparison to the remaining participants were slightly though significantly younger (mean = 13.41 vs.13.87 years, t = 3.40, df = 1237, $p < .05$), more frequently males (60.8% vs. 50.9%, $\chi^2 = 5.23$, $df = 1$, $p < .05$) and more often of non-Swiss nationality (28.1% vs. 13.4%, $\chi^2 = 22.30$, $df = 1$, $p < .001$). However, both groups did not differ in terms of criminal convictions (13.7% vs. 10.1%, $\chi^2 = 1.84$, $df = 1$, $p \geq 0.05$).

Criminal records: Official records were reviewed for each of the study subjects in November 2009. Subsequently, data were anonymised to secure data confidentiality. Because juvenile offences are not registered in Switzerland, only the number and penal codes of the adult crime convictions (18 years of age and older) were included in the present study. Misdemeanours and minor offenses with fines of less than 5000 Swiss Franks were not included in the official data set. Furthermore, due to official regulations, the records of convictions with punishments of less than one year imprisonment were no

longer available after 10 years. Thus, these convictions for minor crimes were not considered in the analyses.

Statistical analyses

First, univariate logistic regression analyses (LR) were performed with psychosocial risk factors, substance use and internalizing and externalizing mental health problems as predictor variables and the presence of adulthood criminal convictions as a dichotomous outcome variable. Second, Pearson correlations of the significant predictor variables were performed. Third, two multivariate prediction models with criminal convictions a as a dichotomous outcome variable were conducted by considering all significant variables from the previous univariate analyses. Male gender was included as a control variable in the multivariate analyses. In the first prediction model, coping was not considered as a predictor whereas the second prediction model included *avoidant coping* as a significant univariate predictor in the analysis. Nagelkerke R^2 as a measure of the explained variance was compared. None of the predictors showed multi-collinearity (variance inflation factor > 10) [34]. All statistics were calculated using SPSS 20.

Ethical approval

The ZAPPS community study was approved by the local school authorities of the government of the Canton Zurich, Switzerland, at a time when there was not yet an existing official ethical committee for scientific studies. Additionally, the study was based on informed consent of all participating adolescents and their parents. In 2009, the study concept was presented to the Swiss Federal Office of Justice in connection with the request for information from the criminal records. The study was approved and supported.

Results

Descriptive findings

A total of 110 (10.1%) subjects of the present sample had been convicted of some type of crime. In terms of the distribution of crimes, traffic and drunk driving offenses were the most frequent (*n* = 75; 68.2% of all crimes), followed by violent crimes (*n* = 12; 10.9%), drug related crimes (*n* = 12; 10.9%) and crimes against property such as theft, burglary, and fencing (*n* = 10; 9.1%). There were 38 cases (34.5%) of other crimes (damage to property, breach of domestic peace, illegal pornography, etc.) that

did not fit into any of the categories mentioned above. Among these 110 subjects, 82 (74.5%) had one conviction, 22 (20.0%) had two convictions, 3 (2.7%) had three convictions, another 3 (2.7%) had more than three convictions in adulthood and 29 (26.4%) committed offenses from multiple categories. Some probands who committed traffic and drunk driving offenses also committed drug-related crimes (*n* = 8; 10.7%) and/or violent crimes (*n* = 7; 9.3%). Overlaps between other offense categories were more seldom.

Descriptive information on the predictor variables and sex differences are shown in Table 1. Boys more frequently were of foreign nationality, showed higher parental rejection scores, had higher externalizing problem scores and presented with more avoidant coping than girls. In contrast, girls showed higher parental acceptance scores, higher numbers of stressors, higher scores of subjective stress, higher internalizing problem scores and more active coping than boys.

Univariate predictors of criminal outcomes in adulthood

The results of the univariate LR predicting any adult criminal conviction are shown in Table 2. Male gender was a positive predictor of adult convictions whereas age was not significant. Furthermore, SES, perceived parental rejection, number of familial stressors, problematic alcohol use, other drug abuse and YSR-externalizing problems were significant predictors for any criminal conviction in young adulthood. The number of external stressor and the subjective measures of stress were not related to adult criminal outcome. Furthermore, avoiding coping significantly predicted later adult convictions. In contrast, active coping was not related to adult convictions. The correlation matrix of the predictor variables is presented in Table 3. Almost all predictors were significantly correlated with each other. SES and avoidant coping showed a less consistent pattern.

Psychosocial and psychopathological factors as multivariate predictors of criminal outcomes in adulthood

The demographic, psychopathology, and substance use variables that were identified as significant predictors of later crime in univariate analyses were entered as independent variables in a multivariate model. In this complex model, criminal activity was predicted by SES, problematic alcohol use and YSR-externalizing problems as shown in the left column of Table 4. Nagelkerke R^2 indicated that approximately 19% of the variance of adult criminal outcomes was explained by these predictors.

Additional exploratory analyses with the inclusion of interaction terms between sex and the predictor variables revealed no significant gender interactions. After inserting the modified YSR-externalizing problem scale (without items that were directly related to criminal behaviours) instead of the original YSR-externalizing scale, similar results were found (Nagelkerke R^2 = 0.19; YSR externalizing modified: OR = 1.08, CI = 1.04–1.13, $p < .001$).

Furthermore, adding avoidant coping to the model resulted in an increase of Nagelkerke R^2 as a measure of the explained variance from 0.19 to 0.20. Despite this rather small increase, the model was improved significantly in comparison to the previous model ($\chi^2 = 6.28$, $df = 1$, $p < .05$). In fact, avoidant coping became a significant multivariate predictor in addition to SES, problematic alcohol use and YSR-externalizing problems which all remained significant as shown in the right column of Table 4. Because active coping failed to be significant in univariate LR analyses, it was not included in the multivariate prediction model.

Discussion

The present study is based on a large community sample with long-term follow-up information over 15 years on young adult crimes as documented in official registers. The study integrated multiple psychosocial and psychopathological risk factors for adult crime that have been reported in previous international studies. The replication analysis used a community sample from Switzerland which is a rather wealthy country without strongly deprived urban neighbourhoods and with a well-developed social service system. Furthermore, within a multivariate model of the origins of adult crime, the role of deviant coping processes was analysed for the first time.

In terms of prevalence, the study found that 10.1% of the former children and adolescents aged 10.7 to 17.9 years had any conviction for crimes in young adulthood between the ages of 18.0 to 33.7 years with males having a five times higher risk of being convicted of an adult crime than females. About two-thirds of the criminal convictions were due to serious offenses or drunk driving offenses. Comparisons with other studies are hampered by the fact that most studies have been based on rather selected samples without any proof of representativeness and mostly consist of males only. The observed prevalence rate of 16.3% in the present sample for males was to some extent lower than the

21.2% conviction rate in former child and adolescent psychiatric patients and the 20.0% rate in their controls in an older cohort of males all born in 1952 [45]. A recent US study found even higher rates of convictions (31.5%) when considering crimes between 16 and 21 years of age [10]. In general, the comparability of conviction rates in different nations is limited due to cultural and juridical differences, varying time frames and specific cohort effects. Furthermore, as convictions for misdemeanours and minor offenses were not registered, the present findings relate to rather serious criminal outcomes.

The findings on the impact of the various risk factors in the present study again mirror the complexity of the development of adult criminal behaviour. First, and as expected, externalising psychopathology, problematic drinking behaviour, and low SES were relevant childhood and adolescent predictors of young adult crimes. Second, and reflecting a controversial discussion in the literature, it was observed that avoidant coping was also an independent risk factor for adult criminality.

So far, no study has addressed the role of coping in the development of adult criminal outcomes. The present study revealed that avoidant coping exerted long-term effects on criminal behaviour independent of externalizing problems and substance use. The present finding expands previous results on avoidant coping in delinquent youths [20, 42] so that the implications need to be reflected.

Children and adolescents who frequently show avoidant coping will have fewer abilities to reflect their problems and will often make others responsible for their situation. Avoidant coping, as measured by the CASQ [43], includes both cognitive and emotional avoidance. Both types of avoidance will not change or solve existing problems. If the problems persist, in the long run avoidant coping will lead to increased rather than reduced stress levels. The inability or failure to manage stress and negative affects in a socially accepted way may lead to illegitimate modes of adaptation including delinquent behaviour [2, 25]. Furthermore, high chronic stress levels eliciting symptoms of irritable mood has been identified as a risk factor for both affective disorders [52] and impulsive aggression [6]. To some extent these inadequate stress mechanisms may also explain the high rates of psychopathology found in detained juveniles [37].

Avoidant coping implies a lack of problem-solving skills that might be addressed in prevention and intervention programs. So far, social skills training in combination with parent and teacher counselling

was effective in the prevention of criminal outcomes in a sample at risk from the Montreal Longitudinal Experimental Study [4]. However, a recent meta-analysis found only moderate effect sizes from child prevention programs on criminal outcomes in adulthood [11]. Since these programs mainly target parental behaviour and child conduct problems, an additional focus on improving adolescent problem-solving skills resulting in more appropriate coping may also increase the effects on preventing later criminal behaviour. The avoidant coping style may also be linked to an antisocial personality style deserving more attention in future forensic research.

The present findings are in accordance with previous community-based studies underlining the role of externalizing psychopathology and substance abuse in adolescence as major predictors of criminal convictions in adulthood [8, 10, 15, 16, 22, 29, 36, 39, 44, 51]. These studies also indicate that, besides criminal behaviours (e.g., stealing or firesetting), other externalizing problems without a direct relation to crime such as lying, temper tantrums, and swearing are also related to adult crimes. Furthermore, as shown in a previous study [44], internalizing problems did not predict later criminal behaviours. Problematic alcohol use during adolescence tripled the risk of committing any adult crime so that it may well play a pivotal role in the development of later criminal outcomes in various ways. Firstly, alcohol may serve as a starter drug for the consumption of further illegal substances [23]. Secondly, the disinhibitory effects of alcohol may lower the thresholds for criminal behaviours [27, 28]. Thirdly, alcohol use may reflect an inadequate coping strategy which increases the possibility of delinquent behaviours [3]. However, the finding that other drug use was not an independent predictor of criminal behaviour in the present community-based sample is in contrast to recently obtained results on drug-related criminality in detained youth and young adults with substance use disorders [38]. The difference in findings may be due to the marked differences of sample origins and the rather low prevalence of illegal drug abuse in the present cohort. Due to a lack of statistical power, no separate analyses were possible to test for the impact of various types of criminal outcomes (e.g., violent crimes). Although it has been found that most risk factors serve as generic correlates of crimes [13], the impact of some psychosocial risk factors may differ between different types of offense. For example, it has found been found that Finnish boys who had an early move away from their family were specifically at risk to commit violent crimes [13].

Our results showing that both low SES and externalizing problems were independent risk factors are in accordance with a study of Finnish boys [44]. Alternatively, this result is in contrast to the

Christchurch Health and Development Study from New Zealand which did not find SES to hold up in multivariate analyses [18]. One explanation might have to do with the assumption that there is less social permeability in European countries like Switzerland and Finland compared to a typical migration country like New Zealand. Therefore, adolescents and young adults more frequently remain in low SES strata with the corresponding risk for criminal behaviours. In these countries, the specific environmental hazards of low income family offspring for the development of adult criminality need more special attention in juvenile crime prevention campaigns.

Finally and in accordance with previous research, other psychosocial risk factors in childhood and adolescence, such as inadequate parenting behaviours and familial stressors, were correlated with mental health problems and significantly predicted later criminal outcomes [14]. However, these risk factors did not hold up in multivariate analyses and were mediated by conduct problems and substance abuse. In contrast, other factors such as criminal neighbourhood and foreign nationality were not relevant for later criminal outcomes in the present study from Switzerland. This could possibly be due to the fact that Switzerland is a country with well-developed social service systems and few areas with a high crime rate.

Limitations

Although the present study was based on a large community sample [50] and sampling was controlled for gender and regional counties of the Canton Zurich, various limitations have to be addressed regarding the generalization of the findings. Males and adolescents with migrant backgrounds were underrepresented in the final sample. The latter fact may be relevant because migrant origins have been identified as risk factors for criminality in Switzerland [24]. Furthermore, original SES data were missing for 342 cases and had to be replaced by the median of the sample. Unfortunately, other psychosocial factors such as parent criminality and delinquent peers have not been addressed by the ZAPPS and could not be included in the analyses.

Another limitation is the lack of official records for juvenile offenses so that the role of preceding adolescent offenses for young adult crime could not be analyzed in the present study. Furthermore, no information on previous incarcerations of the probands who were convicted in adulthood was available. As with register-based data in most counties, a large number of delinquent activities,

particularly by young people, never came to the attention of the authorities. Therefore, the present study may also underestimate the total number of convictions due to insufficient official registrations. Due to the rather small sample size of convicted juveniles and the consequence of limited statistical power, no separate analyses examining the impact of specific offense types were possible. Furthermore, most of the predicting variables of the present study were based on adolescents' self reports. Probably, parent and teacher reports would have been less biased by social desirability than self reports in certain behaviour domains. For example, one study suggests that parent information is more reliable in the domain of externalizing behaviour whereas adolescents are more reliably reporting internalizing problems [54].

Finally, the focus on a variety of selected risk variables does not imply that the model under study is complete in terms of a full explanation of the developmental pathways into young adult crime. The restriction of the most complex model of prediction of young adult crime becomes most obvious when we consider that only 20 percent of the variance of young adult convictions was explained by the adolescent risk variables of the present study.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

References

1. Achenbach TM (1991) Manual for the Youth Self Report and 1991 Profile. Department of Psychiatry, University of Vermont, Burlington, VT
2. Agnew R (1992) Foundation of a general strain theory of crime and delinquency. Criminology 30:47-88
3. Baer PE, Garmezy LB, McLaughlin RJ, Pokorny AD, Wernick MJ (1987) Stress, coping, family conflict, and adolescent alcohol use. J Behav Med 10:449-466
4. Boisjoli R, Vitaro F, Lacourse E, Barker ED, Tremblay RE (2007) Impact and clinical significance of a preventive intervention for disruptive boys: 15-year follow-up. Br J Psychiatry 191:415-419
5. Brook JS, Zhang C, Brook DW (2011) Antisocial behavior at age 37: Developmental trajectories of marijuana use extending from adolescence to adulthood. Am J Addict 20:509-515
6. Caprara GV, Cinanni V, D'Imperio G, Passerini S, Renzi P, Travaglia G (1985) Indicators of impulsive aggression: Present status of research on irritability and emotional susceptibility scales. Pers Indiv Differ 6:665-674
7. Chung HL, Steinberg L (2006) Relations between neighborhood factors, parenting behaviors, peer deviance, and delinquency among serious juvenile offenders. Dev Psychol 42:319-331
8. Cleary A, Nixon E (2011) Early adult outcomes for Irish children with behavioural difficulties. Int J Soc Psychiatry. doi: 10.1177/0020764011421100
9. Compas BE, Connor-Smith JK, Saltzman H, Thomsen AH, Wadsworth ME (2001) Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. Psychol Bull 127:87-127
10. Copeland WE, Miller-Johnson S, Keeler G, Angold A, Costello EJ (2007) Childhood psychiatric disorders and young adult crime: A prospective, population-based study. Am J Psychiatry 164:1668-1675

11. Dekovic M, Slagt MI, Asscher JJ, Boendermaker L, Eichelsheim VI, Prinzie P (2011) Effects of early prevention programs on adult criminal offending: A meta-analysis. Clin Psychol Rev 31:532-544
12. Eftekhari A, Turner AP, Larimer ME (2004) Anger expression, coping, and substance use in adolescent offenders. Addict Behav 29:1001-1008
13. Elonheimo H, Sourander A, Niemela S, Helenius H (2011) Generic and crime type specific correlates of youth crime: a Finnish population-based study. Social psychiatry and psychiatric epidemiology 46:903-914
14. Farrington DP (2000) Psychosocial predictors of adult antisocial personality and adult convictions. Behav Sci Law 18:605-622
15. Farrington DP (1995) The Twelfth Jack Tizard Memorial Lecture. The development of offending and antisocial behaviour from childhood: Key findings from the Cambridge Study in Delinquent Development. J Child Psychol Psychiatry 36:929-964
16. Fergusson DM, Horwood LJ, Ridder EM (2005) Show me the child at seven: The consequences of conduct problems in childhood for psychosocial functioning in adulthood. J Child Psychol Psychiatry 46:837-849
17. Ford JD, Racusin R, Ellis CG, Daviss WB, Reiser J, Fleischer A, Thomas J (2000) Child maltreatment, other trauma exposure, and posttraumatic symptomatology among children with oppositional defiant and attention deficit hyperactivity disorders. Child Maltreat 5:205-217
18. Gibb SJ, Fergusson DM, Horwood LJ (2012) Childhood family income and life outcomes in adulthood: Findings from a 30-year longitudinal study in New Zealand. Soc Sci Med 74:1979-1986
19. Granic I, Patterson GR (2006) Toward a comprehensive model of antisocial development: A dynamic systems approach. Psychol Rev 113:101-131
20. Hasking PA (2007) Reinforcement sensitivity, coping, and delinquent behaviour in adolescents. J Adolesc 30:739-749

21. Hodgins S, Larm P, Molero-Samuleson Y, Tengstrom A, Larsson A (2009) Multiple adverse outcomes over 30 years following adolescent substance misuse treatment. Acta Psychiatr Scand 119:484-493

22. Huesman LR, Eron LD, Dubow EF (2002) Childhood predictors of adult criminality: Are all risk factors reflected in childhood aggressiveness? Crim Behav Ment Health 12:195-208

23. Kandel DB (1982) Epidemiological and psychosocial perspectives on adolescent drug use. J Am Acad Child Adolesc Psychiatry 21:328-347

24. Killias M (2009) Paradise lost? New trends in crime and migration in Switzerland. Soc Crime Law Deviance 13:33-45

25. Kort-Butler LA (2009) Coping styles and sex differences in depressive symptoms and delinquent behavior. J Youth Adolescence 38:122-136

26. Lazarus RS, Folkman S (1984) Stress, appraisal, and coping. Springer, New York

27. Leigh BC (1999) Peril, chance, adventure: Concepts of risk, alcohol use and risky behavior in young adults. Addiction 94:371-383

28. Martin SE (2001) The links between alcohol, crime and the criminal justice system: Explanations, evidence and interventions. Am J Addictions 10:136-158

29. Mason WA, Kosterman R, Hawkins JD, Herrenkohl TI, Lengua LJ, McCauley E (2004) Predicting depression, social phobia, and violence in early adulthood from childhood behavior problems. J Am Acad Child Adolesc Psychiatry 43:307-315

30. McMurran M, Fyffe S, McCorath L, Duggan C, Latham A (2001) 'Stop & Think!': Social problemsolving therapy with personality disordered offenders. Crim Behav Ment Health 11:273-285

31. Moffitt TE (1993) Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. Psychol Rev 100:674-701

32. Moffitt TE, Caspi A (2001) Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. Dev Psychopathol 13:355-375

33. Mueller R, Abbet JP (1991) Changing trends in the consumption of legal and illegal drugs by 11-16-year-old adolescent pupils. Findings from a study conducted under auspices of the World Health Organisation. Swiss Professional Service for Alcohol Problems, Lausanne

34. Myers R (1990) Classical and modern regression with applications. Duxbury, Boston MA

35. Nagin D, Tremblay RE (1999) Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and nonviolent juvenile delinquency. Child Dev 70:1181-1196

36. Odgers CL, Moffitt TE, Broadbent JM, Dickson N, Hancox RJ, Harrington H, Poulton R, Sears MR, Thomson WM, Caspi A (2008) Female and male antisocial trajectories: From childhood origins to adult outcomes. Dev Psychopathol 20:673-716

37. Plattner B, Aebi M, Steinhausen HC, Bessler C (2011) Psychopathological and comorbid disorders of incarcerated adolescents in Austria. Z Kinder Jug-Psych 39:231-240

38. Plattner B, Giger J, Bachmann F, Brühwiler K, Steiner H, Steinhausen HC, Bessler C, Aebi M (2012) Psychopathology and offense types in detained male juveniles. Psychiatry Res 198:285-290

39. Reef J, Donker AG, Van Meurs I, Verhulst F, Van der Ende J (2011) Predicting adult violent delinquency: Gender differences regarding the role of childhood behaviour. Eur. J. Criminol 8:187-197

40. Reitzle M, Winkler Metzke C, Steinhausen HC (2001) Parents and children: The Zurich brief questionnaire for the assessment of parental behaviors. Diagnostica 47:196-207

41. Robinson D, Porporino FJ (2004) Programming in cognitive skills: The reasoning and rehabilitation programme. In: Hollin CR (ed) The essential handbook of offender assessment and treatment. Wiley, Sussex (UK), p 63-78

42. Ruchkin VV, Eisemann M, Hägglöf B (1999) Coping styles in delinquent adolescents and controls: The role of personality and parental rearing. J Youth Adolesc 28:705-717

43. Seiffge-Krenke I (1989) Coping with everyday problem situations: A coping questionnaire for adolescents. Z Diff Diagn Psychol 10:201-220

44. Sourander A, Elonheimo H, Niemelä S, Nuutila A-M, Helenius H, Sillanmäki L, Piha J, Tamminen T, Kumpulainen K, Moilanen I, Almqvist F (2006) Childhood predictors of male criminality: A prospective population - based follow - up study from age 8 to late adolescence. J Am Acad Child Adolesc Psychiatry 45:578-586

45. Steinhausen HC, Meier M, Angst J (1998) The Zurich long-term outcome study of child and adolescent psychiatric disorders in males. Psychol Med 28:375-383

46. Steinhausen HC, Winkler Metzke C (2001) Risk, compensatory, vulnerability, and protective factors influencing mental health in adolescence. J Youth Adolesc 30:259-280

47. Steinhausen HC, Winkler Metzke C (2003) The validity of adolescent types of alcohol use. J Child Psychol Psychiatry 44:677-686

48. Steinhausen HC, Winkler Metzke C (2001) The Zurich life event list: Results from a Swiss epidemiologal study. Kindh Entwickl 10:47-55

49. Steinhausen HC, Winkler Metzke C, Kannenberg R (1999) A questionnaire for adolescents: The Zurich results of the Youth Self Report. University of Zurich, Department of Child and Adolescent Psychiatry, Zurich

50. Steinhausen HC, Winkler Metzke C, Meier M, Kannenberg R (1997) Behavioral and emotional problems reported by parents for ages 6 to 17 in a Swiss epidemiological study. Eur Child Adolesc Psychiatry 6:136-141

51. Stouthamer-Loeber M, Wei E, Loeber R, Masten AS (2004) Desistance from persistent serious delinquency in the transition to adulthood. Dev Psychopathol 16:897-918

52. Stringaris A, Cohen P, Pine DS, Leibenluft E (2009) Adult outcomes of youth irritability: a 20-year prospective community-based study. Am J Psychiatry 166:1048-1054

53. Swiss Federal Institute for Statistics (1992) Swiss Health Survey http://www.bfs.admin.ch/bfs/portal/de/index/infothek/erhebungen_quellen/blank/blank/ess/01.html. Accessed 15 August 2012

54. Verhulst FC, van der Ende J (1992) Agreement between parents' reports and adolescents' self-reports of problem behavior. J Child Psychol Psychiatry 33:1011-1023

55. Winkler Metzke C, Steinhausen HC (2002) Coping stragegies in adolescence. Z Entwickl Padagogis Psychol 34:216-226

56. Zurich Police Department (1995) Criminal statistics of the Canton Zurich 1994. Canton Zurich, Zurich

Table 1: Descriptive findings and sex differences of the predictor variables

Predictors	Female sample (*n* = 533)	Male sample (*n* = 553)	Test statistics[1]	Total sample (*N* = 1,086)
Mean age in years (SD)	13.83 (1.53)	13.92 (1.70)	-0.89 n.s.	13.88 (1.62)
Psychosocial factors				
Mean rank of SES	557.13	530.37	140'110 n.s.	543.50
Foreign nationality (%)	60 (11.3%)	86 (15.6%)	4.30 *	146 (13.4%)
Mean neighbourhood crime rate	102.23	104.59	-0.27 n.s.	103.43 (142.36)
Mean parental acceptance (SD)	25.99 (5.72)	25.15 (5.81)	2.37 *	25.56 (5.78)
Mean parental rejection (SD)	6.64 (4.32)	8.00 (4.80)	-4.92 ***	7.34 (4.62)
Mean parental control (SD)	10.86 (3.41)	10.95 (3.47)	-0.44 n.s.	10.91 (3.44)
Mean no. of external stressors (SD)	3.90 (2.77)	3.47 (2.61)	2.35 *	3.66 (2.70)
Mean no. of familial stressors (SD)	2.04 (1.89)	1.69 (1.59)	3.34 **	1.86 (1.75)
Mean subjective external stress (SD)	4.63 (4.06)	3.77 (3.58)	3.68 ***	4.19 (3.85)
Mean subjective familial stress (SD)	2.51 (2.84)	1.89 (2.34)	3.94 ***	2.20 (2.62)
Substance use				
Problematic alcohol use (%)	25 (4.7%)	34 (6.1%)	1.12 n.s.	59 (5.4%)
Drug abuse (%)	23 (4.3%)	32 (5.8%)	1.22 n.s.	55 (5.1%)
Psychopathology				
Mean YSR-externalizing (SD)	9.05 (5.74)	10.61 (6.47)	-4.21 ***	9.84 (6.17)
Mean YSR-internalizing (SD)	10.48 (7.39)	8.44 (6.09)	4.95 ***	9.44 (6.83)
Coping				
Mean active coping (SD)	5.30 (1.36)	4.89 (1.51)	4.68 ***	5.09 (1.45)
Mean avoiding coping (SD)	2.97 (1.65)	3.23(1.75)	-2.51 *	3.11 (1.70)

Note: SES = Socio-Economic Status; [1]Test = t-test for continuous variables, Mann-Whitney for SES, χ^2 for dichotomous variables

*p < .05. **p < .01. ***p < .001.

Table 2: Univariate associations of predictors with adult crime (*N* = 1,086)

Control variables	OR	CI (95%)
Male gender	**4.99*** **	3.02–8.23
Age	1.03 n.s.	0.91–1.16
Predictors		
Psychosocial factors		
Socio-economic status (SES)	**0.65***	0.46–0.91
Foreign nationality	1.50 n.s.	0.89–2.52
Neighbourhood crime rate	1.00 n.s.	1.00–1.00
Parental acceptance	0.98 n.s.	0.95–1.02
Parental rejection	**1.08*** **	1.03–1.12
Parental control	1.01 n.s.	0.95–1.07
No. of external stressors	1.07 n.s.	1.00–1.14
No. of familial stressors	**1.12***	1.01–1.24
Subjective external stress	0.99 n.s.	0.94–1.04
Subjective familial stress	1.04 n.s.	0.97–1.12
Substance use		
Problematic alcohol use	**4.89*** **	2.72–8.79
Drug abuse	**2.66****	1.36–5.21
Psychopathology		
YSR-externalizing	**1.11*** **	1.08–1.14
YSR-internalizing	1.02 n.s.	0.99–1.04
Coping		
Active coping	0.89 n.s.	0.78–1.01
Avoiding coping	**1.28*** **	1.14–1.43

Note: OR = Odds Ratio; CI = Confidence intervals

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3: Bivariate correlation matrix of the predictor variables (*N* = 1,086)

Predictors	1	2	3	4	5	6	7
1) Socio-economic status (SES)	1	-0.07*	0.01	-0.02	-0.05	-0.04	-0.10**
2) Parental rejection		1	0.21***	0.12***	0.08**	0.44***	0.26***
3) Number of familial stressors			1	0.15***	0.17***	0.31***	0.02
4) Problematic alcohol use				1	0.28***	0.28***	0.03
5) Drug abuse					1	0.35***	0.04
6) YSR-externalizing problems						1	0.22***
7) Avoiding coping style							1

Note: *p < .05. **p < .01. ***p < .001.

Table 4: Multivariate associations of predictors and criminal convictions in adulthood (*N* = 1086)

	Model 1 without coping		Model 2 with coping	
Nagelkerke R^2	0.19		0.20	
Control variable	OR	CI (95%)	OR	CI (95%)
Male gender	4.67**	2.76-7.89	4.57***	2.70-7.72
Predictors				
Psychosocial factors				
Socio-economic status (SES)	**0.73***	0.55–0.97	**0.74***	0.55–0.98
Parental rejection	0.99	0.95–1.04	0.98 n.s.	0.94–1.03
No. of familial stressors	1.06	0.94–1.21	1.07 n.s.	0.95–1.22
Substance abuse				
Problematic alcohol use	**2.58****	1.27–5.25	**2.81****	1.38–5.72
Drug abuse	1.14	0.51–2.54	1.11 n.s.	0.50–2.47
Psychopathology				
YSR-externalizing	**1.08*****	1.04–1.12	**1.07*****	1.03–1.11
Coping				
Avoiding coping style			**1.18***	1.04–1.34

Note: *$p < .05$. **$p < .01$. ***$p < .001$.